



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

given. The first works printed with these new types were the two beautiful editions of Pliny's *Natural History*, one by John of Spires at Venice in 1469, the other by Nicholas Jenson, also at Venice, in 1472. Aldus Manutius attempted in 1501 to introduce the Aldine or Venetian Italic, but the Roman soon spread from Venice all over the west of Europe. Although the Germans still continue the use of a form of black letter, about one-half their books are in Roman."

---

*Horologium Achaz (Christophorus Schissler, Artifex).*

*By Julius F. Sachse.*

*(Read before the American Philosophical Society, February 1, 1895.)*

Among the scientific apparatus, models and philosophical instruments preserved in the cabinets of this Society, there have been conspicuously displayed two brass plates, finely wrought, engraved, chased and gilded, without, however, bearing any label explanatory of their former use or import.

As a matter of fact they are parts of a unique instrument, the equal of which is not to be found in any museum or scientific collection in the world.

Unfortunately, several parts of this instrument are missing, and among them the mythological figure which once stood upon the base, and elevated or held up the larger plate or basin. The gnomon or rod used to cast a shadow, as well as the apparatus held aloft by the figure upon the rim, whereby a fine pencil of light was thrown upon the dial in place of a shadow (Photo-Sciaterica), are also wanting; the magnetic needle in the small compass in the base has also long since disappeared.

I have endeavored to restore this instrument as well as I could, in the absence of any definite account of how it was in its original state; for no published description was allowed by the censorship of the press, for reasons which I will explain in the course of this paper.

It will be noticed that I have substituted a tripod between base and dial, in place of the lost figure. The instrument was known by the mystics and philosophers of old as an "HOROLOGIUM ACHAZ," or Dial of Achaz.



**HOROLOGIIUM ACHAZ.**

CHRISTOPHORUS SCHISLER, GEOMETRICUS AC ASTRONOMICUS ARTIFEX,  
AUGUSTÆ, VINDELICORUM, FACIEBAT, 1578.

NOW IN THE CABINET OF THE AMERICAN PHILOSOPHICAL SOCIETY.

The smaller of the two pieces measures five and three-quarter inches in diameter, and it formed the base of the instrument. It is made of an alloy, of which silver and copper form the chief ingredients. In a raised centre it contains a compass, one inch in diameter. The intervening space is arranged in two circles, filled with mythological deities and mythical marine monsters, all finely wrought and chased (*ciselirt*).

If we reverse this base, we find beneath it a finely engraved plate heavily gilded with an amalgam of fine gold. It is slightly concave. This plate is divided into five panels; two of these divisions are graduated for different elevations and bear the following inscription, viz.: "Horologii Achaz hydrographica declinatio ad elevat: Poli 44-45-46, Gradv:" and "47-48-49," respectively. Two others contain pictorial scenes which will be described later on. The helix in the centre, which forms the fifth division, contains the following description, viz.: "*Notat concha isthac hemiciclea capitis 38 Esaia miraculum: nam hanc si aqua labrum usque impleveris umbra solis 10 imo: 20. gradibus retrorsum fertur signum ac gradum solis: quin etiam horam diei volgarem quamcunque una cum planetarum quas vocant horis denuncians.*" (Translation: "This semicircular shell explains the miracle of the 38th chapter of Isaiah. For if you fill a basin altogether with water, the shadow of the sun is borne backward by ten degrees. Moreover, it indicates any common hour of the day whatever, together with that of the planets which they call hours.")

The larger piece is a basin-shaped plate, made of common brass or gun metal, with a flat, moveable rim one inch wide. Upon this are engraved the signs of the zodiac. On the reverse of this rim, which surrounds the large basin, is engraved the following inscription: "CHRISTOPHORVS SCHISSLER, GEOMETRICVS AC ASTRONOMICVS ARTIFEX AVGVSTÆ VINDELICORVM, FACIEBAT ANNO 1578."

The centre or concave part of this plate is ten inches in diameter, and is geometrically divided into the different planetary houses. The depth of the basin is one and three-quarter inches, and the whole once formed the dial of the instrument.

The rim is surmounted by a brass figure, three and three-quarter inches in height, representing an ancient prophet or astrologer, with the left hand extended so as to hold the "gnomen" used to cast the shadow or to throw the requisite pencil of light.

This instrument was formerly used, nominally, for calculating



REVERSE OF DIAL.

HOROLOGIUM ACHAZ.  
(DIAMETER ONE-FOURTH OF ORIGINAL.)

FIGURE UPON THE RIM (SIZE TWO-THIRDS OF ORIGINAL.)

FACE OF DIAL.

nativities, and in the various occult studies wherein the hour of the day or night, and the position of the planetary system of the heavens took a prominent part, as by its aid it was possible to see, not only the true time of day by sunlight, and at night by moonlight, but other solar phenomena, such as the true time of sunrise and sunset ; the orb's place in the twelve houses of the zodiac ; its perigee and apogee ; its height above the horizon ; the relative length of the day and night, as well as many other astrological data.

There is, however, another peculiarity about this instrument. In the hands of the Astrologus or Magus of the sixteenth century, it was capable, at the will of the operator, of apparently reversing the laws of nature. Thus, if the basin was filled with water or any other translucent liquid, the time marked was advanced or retarded as many degrees as equal the angle of refraction ; thereby repeating the miracle of Isaiah.

To thoroughly illustrate this latter fact, as well as the somewhat obscure inscription within the helix upon the plate beneath the base, and on the two engraved panels, it will be necessary for us to make a practical test of the apparatus and to take up the references to the instrument as given in Holy Writ, even though it may reflect somewhat upon the integrity of the prophet of old, who evidently had some practical inkling of the then unknown laws of refraction.

By referring to the thirty-eighth chapter of the Book of Isaiah, in the eighth verse we read :

“ Behold, I will bring again the shadow of the degrees, which is gone down in the sun-dial of Ahaz ten degrees backward. So the sun returned ten degrees, by which degrees it was gone down.”

This is what is known as the great miracle of Isaiah, and is portrayed in one of the engraved panels upon the base plate of the instrument. It will be noticed that the invalid sovereign is in his bed, while the prophet is pointing to a sun-dial, which, however, in the representation, is a vertical one—a precaution that was resorted to for obvious reasons by the Augsburg artificer, to distract attention from the true character of this instrument, in case it should ever fall into the possession of the profane.

The other engraved panel on the base plate illustrates the twenty-first verse of the same chapter of the Book of Isaiah, viz.: “ For Isaiah had said, Let them take a lump of figs, and lay it for a plaster upon the boil, and he shall recover.”

We have here portrayed the consummation of the miracle. The

king is seen seated upon a throne, with his right leg extended, while the prophet is applying a poultice of figs to the wicked carbuncle. An attendant, in the rear, it will be noticed, holds a basketful of the same remedy in reserve.

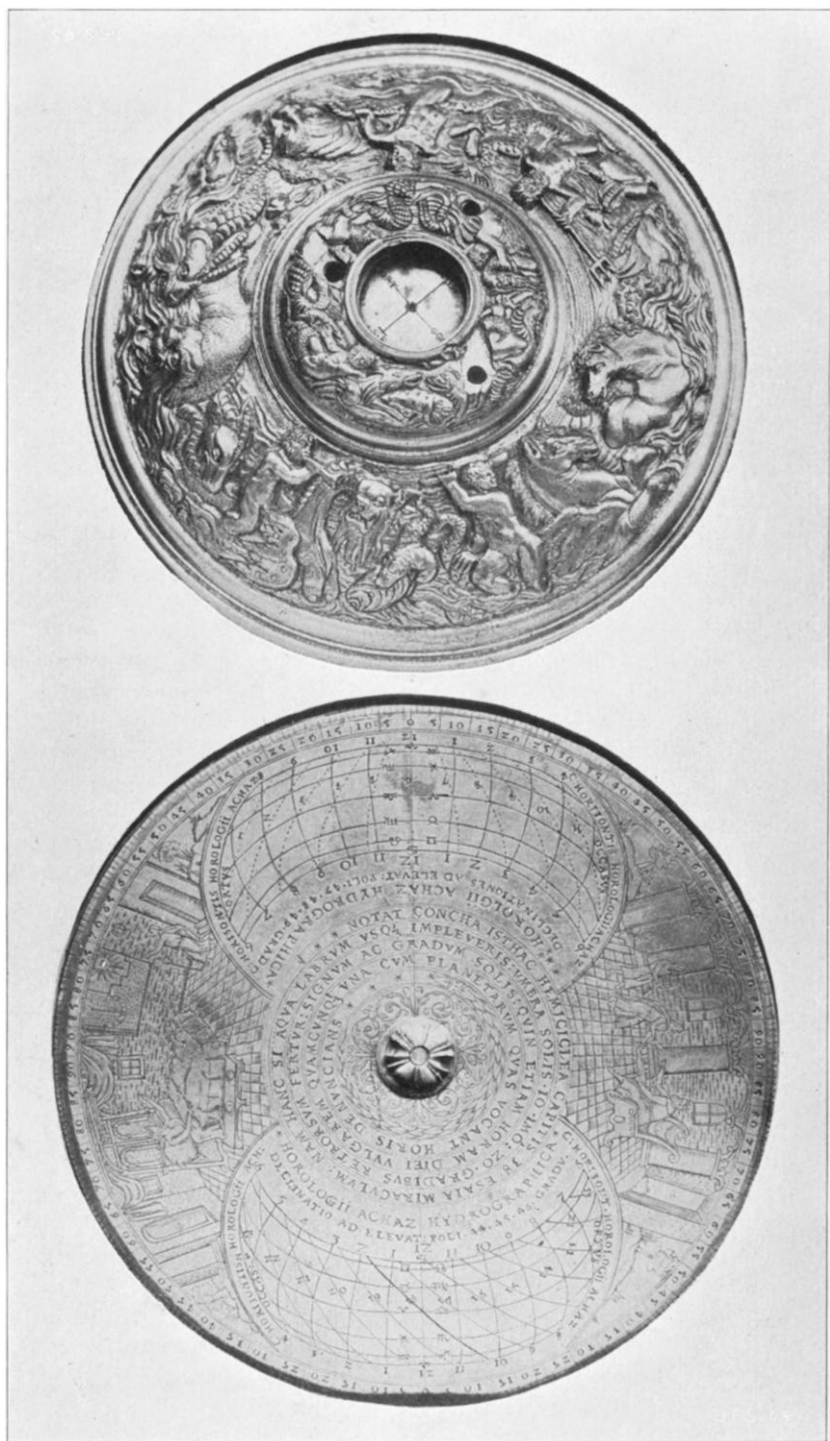
The above mention of the "Dial of Achaz" which had the property of going backwards ten degrees at the command of the old prophet, is the earliest reference to any instrument for the purpose of marking the true time of day of which mention is made in the world's history.

Achaz, who was the son of Jotham and the eleventh king of Judah, about the year 771 B.C. went to Damascus to greet his benefactor, Tiglath Pileser. He saw there a beautiful altar, and sent working drawings of it to Uriah, the priest in Jerusalem. An altar was completed against his return. He likewise set up the dial which is mentioned in the miraculous cure of his son Hezekiah, thirteen years after the death of Achaz. This is the first dial upon record, and is 140 years before Thales, and nearly 400 years before Aristotle and Plato, and just a little previous to the lunar eclipses observed at Babylon as recorded by Ptolemy.

That this instrument and its peculiar properties were not unknown to the scientific faculty of the Helmstadt University, is shown by the Memoirs of Uffenbach, that were published at Ulm, in the early part of the last century. The University at that time was presided over by Dr. Johann Fabricius (Altdorfinus), who was the former tutor at Altdorf of Johannes Kelpius, Magister of the Rosicrucian Community, on the Wissahickon, in Pennsylvania (1694-1708).

Zacharias von Uffenbach, the celebrated scientist and traveler, and former classmate of the younger Falkner at Halle, notes in the Index to his Memoirs, *Sun-dial,—Hiskia, Where the Shadow Turns Back, Curieux*, ii, 542. But on referring to the place indicated, no reference whatever to the subject is to be found. The inference is that the whole matter was, at that time, suppressed by the Censor. There is, however, a reference to the instrument by the same writer in another volume of his Memoirs (Vol. i, 252) of which no mention is to be found in the Index.

Uffenbach, who was always careful to note down the most minute particulars of any special scientific matters brought to his notice, states that, while on a visit to the University Library, Abt Schmid called his attention to a description of this peculiar instrument, and then continues that "he would attribute the especial discovery of



HOROLOGIUM ACHAZ.

BASE WITH COMPASS.

ENGRAVED BASE PLATE.

(SIZE ABOUT TWO-THIRDS OF ORIGINAL.)



this peculiar sun-dial to an atheist, and that it would be apt to give such as had no faith in miracles the idea that this was the sun-dial which, by the retrogression of its shadow, furnished the sign for King Hezekiah; or that it was a similarly constructed instrument having the same property, and which being known to the prophet, he, on that account, proposed that particular test to the King."

During a late visit to Europe, a careful search was instituted in the various museums for a duplicate of this Horologium, but without result. So scarce and sought-after are the specimens of Schissler's ingenuity, that the great Germanic National Museum at Nuremberg contains, I think, merely a small pair of dividers from this great artificer. The museum of his native city, Augsburg, contains nothing whatever of his handiwork.

Failing in my efforts to find a duplicate or a similar instrument in either Germany or France, by the aid of which our own specimen might be restored to its original condition, as a matter of interest, I next endeavored to obtain whatever information was to be had relative to the ingenious mechanic whose name adorns the rim of our specimen. Here I was more successful, thanks to the courtesy of Herr Hans Boesch, Director-in-Chief of the Germanic National Museum. The following references to the artificer were found in the Archives of the Museum, viz. :

In Paul von Steffen's account of the "Kunst-, Gewerbt-, u. Handwerks-Geschichte der Reichsstadt Augsburg," it is recorded, that more noteworthy than any one is Christophorus Schissler. This man, according to his apprenticed trade, was a brassworker in a small way, or brazier. His talents, however, led him into geometry, mechanics and astronomy. Therefore, he subsequently called himself a geometric and astronomical master mechanic (*Werkmeister*).

From this artist, continues the old chronicler, there stands in the Bodleian Library at Oxford, England, a solid gold quadrant, which measures more than a Rhenish foot square, and has a weight of six to eight pounds. Upon this instrument is engraved in large letters, "CHRISTOPHORVS SCHISSLER, GEOMETRICVS AC ASTRONOMICVS ARTIFEX, AVGVSTAE VINDELICORVM FACIEBAT, 1579."

I will here state that this quadrant was also known and described by Zacharias von Uffenbach, who states (Vol. iii, 101, 102) that it was of pure gold, and was covered with scales, divisions and calculations, which he thought were poorly executed. The

Librarian of the University at Oxford, however, differed with him, and gave the opinion that the calculations were of even greater value than the precious metal of which the instrument was constructed.

Uffenbach concludes by stating that he would rather have a quadrant with more modern calculations and divisions, and made of gilded brass, as then he would not be afraid to put it to a practical use. He also verifies the dimensions, weight and inscription as above noted.

Speaking of the inscription, the question was raised here some time ago as to the meaning of the word "VINDELICORVM" as applied to this instrument. I will state that the term denotes that the artificer was descended from the ancient German race of the Vindelici, whose chief city, in former times, was "AUGUSTA," therefore "AVGVSTAE VINDELICORVM"—the modern Augsburg.

Again referring to the old records in the Germanic National Museum, it is there stated that Schissler constructed numerous ingenious scientific apparatus and automata for the Emperor Rudolph II. of the Holy Roman Empire. This fact alone, continues the old chronicler, furnishes ample proof of the repute that the artificer had gained by his proficiency in the mechanical arts.

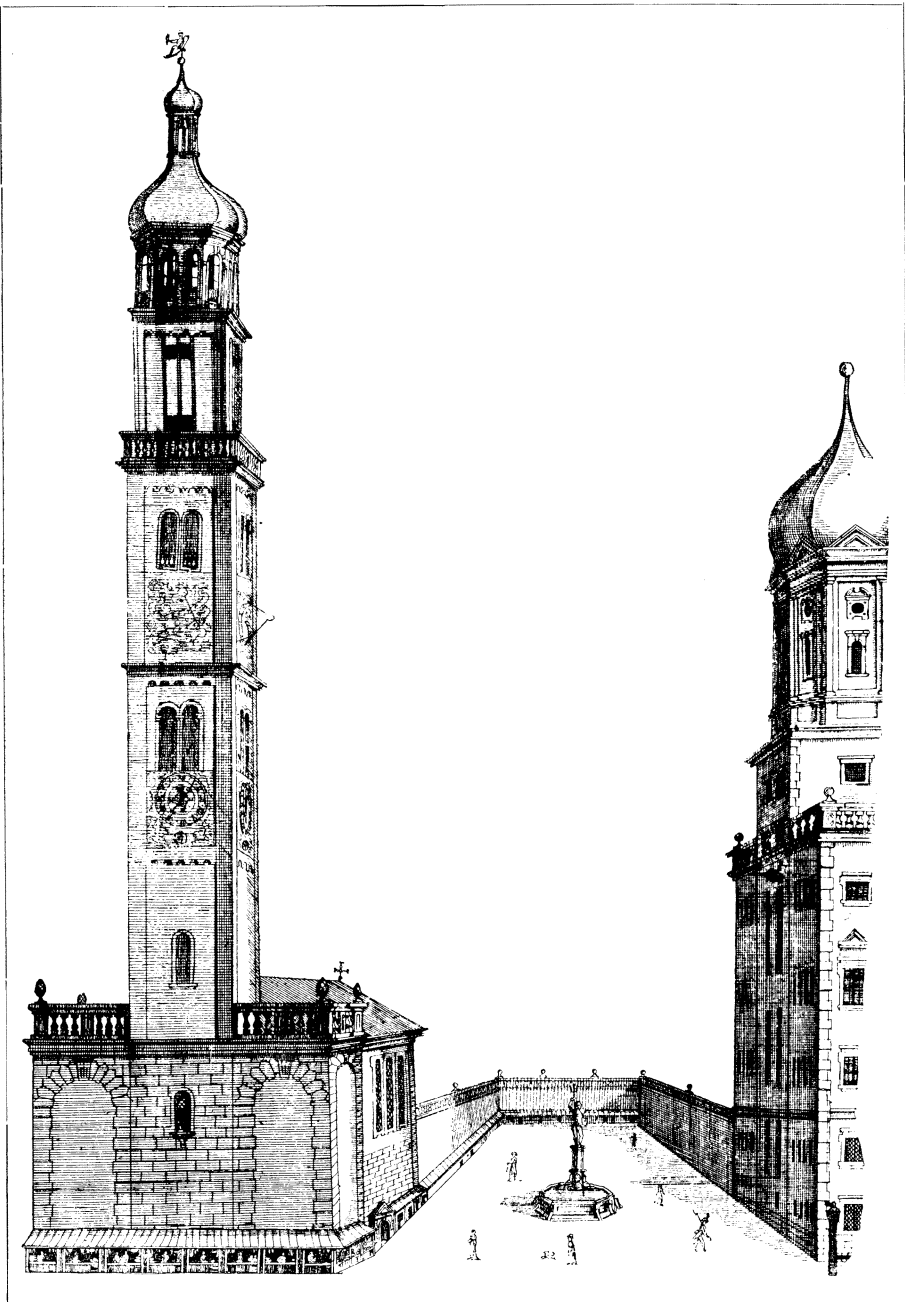
In the year 1600, Schissler was commissioned by the authorities to survey and plot his native city and the suburbs as well as the Imperial Bailiwick (Reichs-Landvogtey). The plan of the city was engraved on copper by Alexander Mair, a noted artist of that day. The other plans were stored at the Land Office. (During my search at Augsburg, none were to be found.)

In the year 1606, Schissler constructed a large *Sphæra Armillaris*, which he presented to the magistrates of his native town, and which was there exhibited for many years in the "Stadt-Bibliothek," but is now missing.

In conclusion, the chronicler states, "in these days (early in the seventeenth century) many of our learned scientists became proficient in Geometry (*Messkunst*) but chiefly in Astronomy."

An equally interesting reference was found in the old "Memorial Buch," wherein one Hector Maire mentions that, in the year 1561, Christophorus Schissler constructed the four large sun-dials upon the "Perlachthurm," at Augsburg, where they still, after a lapse of three centuries, mark the time of day.

The Perlachthurm is one of the peculiar landmarks of the ancient



THE SUNDIALS ON THE PERLACH THURM,  
AUGSBURG, GERMANY.

CHRISTOPHORUS SCHISSLER ARTIFEX, 1561.

FROM AN OLD ENGRAVING BY E. HESS.

city, at the confluence of the Wertach and the Lech, and commands a view of the surrounding country. This solitary tower, of which I have here a contemporaneous engraving by Hess, dates back to the tenth century, but has been altered and restored upon several occasions, notably towards the close of the sixteenth century, when it was raised by the celebrated architect, E. Holl, to its present height of 326 feet. It was on this occasion that Schissler was commissioned to construct the four sun-dials, two of which are seen in the engraving. This tower was built as a watch-tower, to discover the approach of the enemy. At the present time it does duty as a look-out for the fire patrol.

The old chronicler goes on to state that Schissler received the sum of 400 florins for his labor on the four dials, while his wife was given 6 florins for assisting her husband.

The account also says that the survey of the city was commenced in 1598. Schissler also surveyed, with the aid of his son, the Lechstrom, completing the work in 1603. From official records it appears that for five years' labor he received the sum of 500 florins, in addition to his expenses.

The Memorial Buch further states that his Meisterstück or *chef-d'œuvre* was placed in the Mathematical Hall of the Zwinger, or Royal Museum at Dresden. It was a *quadratum geometricum*, and bears, beside his usual inscription, the date 1569. This apparatus was for the purpose of measuring both elevation and distance, in which the divisions were given by transverse lines.

He also constructed an ingenious odometer or measuring wheel (*Wegmesser*) which is described by Kirchner, p. 221, Ed. Colon., 1647.

From the above enumerations of Schissler's handicraft, we are safe in assuming that the Augsburg artificer was one of the most ingenious mechanics of his time.

In searching for other scientific authorities who were acquainted with instruments having a similar property, and had left a record of the fact, it is found that Varenus, in his *Geographica Generalis*, makes some general mention of what may be called a refracting dial.

Leybourne, in his work on Gnomonicks (London, 1682), notes that such dials were to be made in two ways, one where the gnomon was hidden all under the water; the other, where the point was above the water. Our own specimen was evidently one that combined the

two principles; a conclusion arrived at by the space for the stylus on the meridial line, which has been replaced, and the figure upon the rim, which evidently supported the elevated gnomon upon the same line.

Ozanan, in his *Recreations* (London, 1708), also gives a problem "to describe a dial by refraction."

The first public mention of, or reference to, the phenomena of the refraction of light was made by Willebrord Snellius (1591-1626), the celebrated mathematician, shortly before his death, or about a half century after it had been practically demonstrated by the Augsburg artificer, as is proven by the specimen here brought to your notice.

After the death of Snellius, René Descartes, by some means, came into possession of the former's experiments on the refraction of light, and published an account of the phenomena, in his *Principia Philosophiæ*, 1637, with several illustrations, from which we may obtain a possible clue to the missing parts once elevated by the figure upon the rim of our interesting specimen.

Schotus, in his *Magia Universalis*, published in 1657, also illustrates the refraction of light, Pl. xxiii, by a simple experiment and plate. None of the above references to a refracting dial, or the refraction of light, however, make any reference to the miracle of Isaiah; thus showing that our scientific relic is unique of its kind, and was known only to persons who were intimately versed in the higher phases of occult philosophy.

The written records of this venerable Society, so far as I have been able to discover, fail to show just from whom this interesting relic of Christopher Schissler's handiwork was received, or even when it came into possession of the Society.

Tradition, however, connects this instrument directly with Dr. Christopher Witt, the last surviving member of the Rosicrucian Community, which two hundred years ago was located on the banks of the romantic Wissahickon, in the vicinity of Philadelphia, and usually known as the "Hermits on the Ridge." Dr. Witt, prior to his death in 1765, gave some of his philosophical and scientific apparatus to the local Philosophical Society, then presided over by Benjamin Franklin, among which presumably was the specimen under discussion.

It will here again be necessary to take a short retrospect, viz.: Between the years 1691-1693, a company of religious and philo-

sophical enthusiasts or mystics was organized in Germany. Their purpose was to escape the religious and secular proscription under which they suffered, by emigration. They naturally cast longing eyes towards Pennsylvania, where liberty of conscience was assured.

These enthusiasts had all received a liberal education, six of the number being clergymen. All were members of the theosophical brotherhood known as "Rosicrucians," and were under the leadership of Magister Johann Jacob Zimmermann, who, as you will see by reference to the reports of the Royal Society, was one of the most noted astronomers of the time in Europe. It is to the possession of this philosopher that this instrument has been traced, prior to his leaving Nuremberg. When finally the "Chapter of Perfection," consisting of the mystic number of forty, was completed, the start was made from the two rallying points, Halberstadt and Magdeburg, for Rotterdam, whence they were to embark for the New World.

Upon the very eve of embarkation, Magister Zimmermann died. The vessel, containing his effects, sailed for America, and Johann Kelpius was elected Magister in his stead; under his guidance, the party of mystic philosophers came to these shores, and upon the romantic banks of the Wissahickon erected a tabernacle in the forest, suited to their occult studies and researches. The structure was surmounted by a "Lantern or Observatory" (*Sternwarte*), in which a nightly watch was kept for celestial phenomena. This was the first regular observatory established in North America.

It is a noteworthy fact in connection with this community, that here in the wilds of the New World were practiced the various mysteries and rites of occult philosophy and esoteric theosophy.

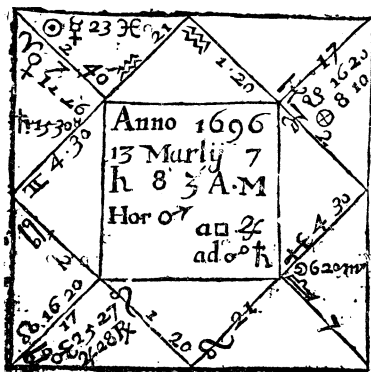
Here the crucible of the alchemist frequently fumed until long after midnight, while the alembic of the Magister was distilling juices of herbs gathered at the dark of the moon, in the hope of discovering the "Philosopher's Stone" or the "Elixir of Life,"—in contrast, as it were, to the lonely watch maintained in the "Sternwarte" on the lookout for the harbinger of the Bridegroom, who was to appear in silky holiness.

Some of the horoscopes that were calculated and cast by these Hermetic philosophers, on the Wissahickon, are still treasured as precious heirlooms among some of the leading families of this State.

To return to our *Horologium*. It is known that after the death of Kelpius, in 1708, and the virtual disbanding of the Community,

all of the philosophical instruments, as well as Zimmermann's astronomical apparatus, passed into the possession of Daniel Geissler and Dr. Christopher Witt. The latter then went to Germantown, and continued in his profession as "Practitioner of Physick" until the end of his days.

It is further known from his correspondence that has come down to us, that Dr. Witt was a close friend of both John Bartram and Benjamin Franklin; also that he was upon intimate terms with others of the original American Philosophical Society: all facts going to substantiate the old tradition as to the actual donor of this HOROLOGIUM ACHAZ HYDROGRAPHICUM, and that the interesting instrument is not only a relic of German mechanical ingenuity of three centuries ago, but also of the chapter of "True Rosicrucians" who settled in the Province of Pennsylvania two centuries ago, and were the first community of Hermetic philosophers who attempted to put their occult teachings to a practical test.



*An Old Germantown Horoscope.*